

283

of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.

What is claimed is:

1. A fluid handling apparatus comprising:
at least one pipette head, wherein the at least one pipette head comprises a pipette nozzle configured to connect with a tip that is removable from said nozzle, wherein the tip has a (i) proximal end engageable with the nozzle and (ii) a distal end; and
a base connected to the at least one pipette head, wherein said at least one pipette head has provides a continuous fluid path of a given length that terminates at the distal end of the tip when the tip is engaged with the pipette nozzle,
and wherein the length of the continuous fluid path is adjustable by moving the pipette nozzle relative to the base without affecting movement of fluid from the tip when the tip and the pipette nozzle are engaged.
2. The apparatus of claim 1, wherein pipette nozzle is movable relative to the base by moving uniaxially relative to the base.
3. The apparatus of claim 1, wherein the fluid path is formed using rigid components.
4. The apparatus of claim 1, further comprising a ventilation port within the pipette head, said port having an open position and a closed position, physically independent of the position of a plunger within the apparatus.
5. The apparatus of claim 4, further comprising a solenoid and/or a valve that control opening or closing of the ventilation port, physically independent of the position of a plunger within the apparatus.
6. The apparatus of claim 4, wherein the ventilation port is coupled to a positive pressure source that is useful for the expulsion of the fluid, and/or a negative pressure source that is useful for the aspiration of the fluid.

284

7. The apparatus of claim 4, wherein the ventilation port is coupled to a reversible pump capable of delivering positive or negative pressure.

8. The apparatus of claim 4, wherein the removable tip comprises two openings, each of which has an embedded passive valve.

9. The apparatus of claim 1 further comprising tubing terminating at the pipette nozzle, forming at least a portion of the fluid path.

10. The apparatus of claim 9 wherein the tubing comprises a rigid inner tubing and a rigid outer tubing, wherein the rigid inner tubing is movable with respect to the outer tubing.

11. The apparatus of claim 1 wherein the length of the fluid path is adjustable by moving the pipette nozzle relative to a plunger and the base within the apparatus without affecting movement of fluid from the tip when the tip and the pipette nozzle are engaged.

12. The apparatus of claim 1 further comprising a plunger within the apparatus, said plunger having a proximate end closer to the pipette nozzle and a distal end further from the pipette nozzle, and the length of the fluid path starts at a proximate end of the plunger.

13. The apparatus of claim 1 wherein the base is connected to a plurality of pipette heads.

14. The apparatus of claim 1 wherein a plurality of pipette nozzles are independently movable relative to the base.

15. The apparatus of claim 1 further comprising a motor that effects the movement of said pipette nozzle relative to said base.

16. The apparatus of claim 14 further comprising a motor that effects the movement of said plurality of pipette nozzles relative to said base.

17. The apparatus of claim 1 wherein the fluid path comprises a liquid.

18. The apparatus of claim 1 wherein the fluid path comprises a liquid and a gas.

* * * * *